

## 2.1-2.4 Review

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

**Simplify each expression by adding, subtracting or multiplying. Show work!**

1.  $(3x^2 - 4x + 1) + (2x^3 + x^2 - x - 4)$

2.  $(-x^2 - 4x - 2) - (2x^3 + 3x^2 - x - 1)$

3.  $(4x - 3)(x^3 + 3x^2 - x - 1)$

4.  $(x + 5)(2x - 1) - (3x^2 - 16x + 3)$

**Multiply the expression using the polynomial identities. Show work!**

5.  $(3x + 2y)^2$

6.  $(x - 2y)^3$

7.  $(x - 4)(x + 6)$

8.  $(5x + i)(5x - i)$

**Factor the expressions using the polynomial identities. Show work!**

9.  $16x^2 - 49$

10.  $x^3 + 125$

11.  $x^2 - 4x - 21$

12.  $9x^2 + 81$

13. Given  $x^3 - 3x^2 - x + 3$ , use the Remainder Theorem to determine which of the following is a factor?  
Show work!

a)  $x + 3$

b)  $x - 3$

c)  $x + 1$

14. Given  $2x^3 + x^2 - 5x + 2$ , use the Remainder Theorem to determine which of the following is a factor? Show work!

a)  $x + 3$

b)  $x - 1$

c)  $x + 2$

Describe the end behavior of each polynomial using limits.

15.  $f(x) = (x + 3)(x - 1)(2x - 5)$

$$\lim_{x \rightarrow -\infty} f(x) = \quad \quad \quad \lim_{x \rightarrow +\infty} f(x) =$$

16.  $f(x) = -(x + 4)^2(x - 2)$

$$\lim_{x \rightarrow -\infty} f(x) = \quad \quad \quad \lim_{x \rightarrow +\infty} f(x) =$$

17.  $f(x) = -2x^3 - 3x^2 + 36x - 58$

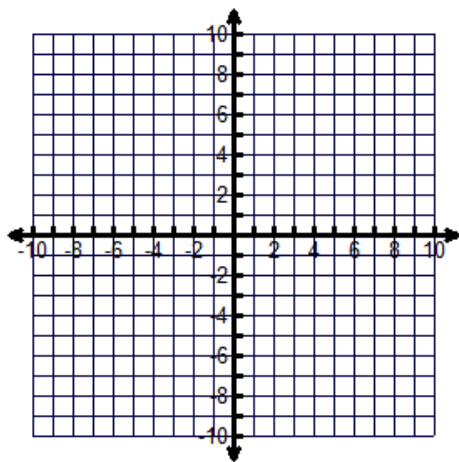
$$\lim_{x \rightarrow -\infty} f(x) = \quad \quad \quad \lim_{x \rightarrow +\infty} f(x) =$$

18.  $f(x) = 3x^4 - 7x^3 + 16x^2 - 15x + 65$

$$\lim_{x \rightarrow -\infty} f(x) = \quad \quad \quad \lim_{x \rightarrow +\infty} f(x) =$$

State the degree and list the zeros of the polynomial. State the multiplicity of each zero and determine whether the graph crosses or touches the  $x$ -axis at the corresponding  $x$ -intercept. Then sketch a graph.

19.  $f(x) = -2x^3(x+8)$  Degree: \_\_\_\_\_

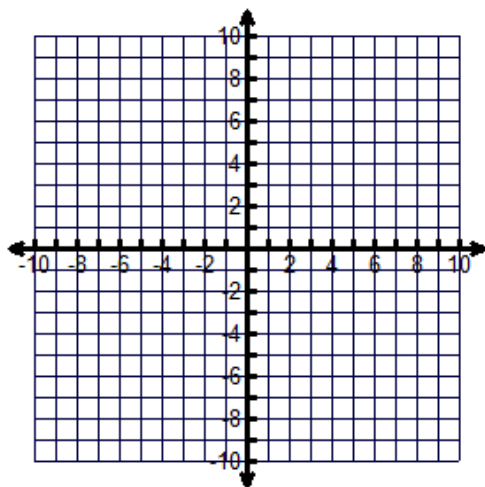


Zero	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow -\infty} f(x) =$$

$$\lim_{x \rightarrow +\infty} f(x) =$$

20.  $f(x) = (x+1)^2(x-5)^3(x+3)^2$  Degree: \_\_\_\_\_



Zero	Multiplicity	Touch/Cross

$$\lim_{x \rightarrow -\infty} f(x) =$$

$$\lim_{x \rightarrow +\infty} f(x) =$$

21. Graph the given polynomial function using a graphing calculator and then find the following:

$f(x) = -x^3 + 3x^2 + x - 3$  Zeros (write as ordered pairs): \_\_\_\_\_

y-intercept (write as an ordered pair): \_\_\_\_\_

End Behavior:  $\lim_{x \rightarrow -\infty} f(x) =$

$\lim_{x \rightarrow +\infty} f(x) =$